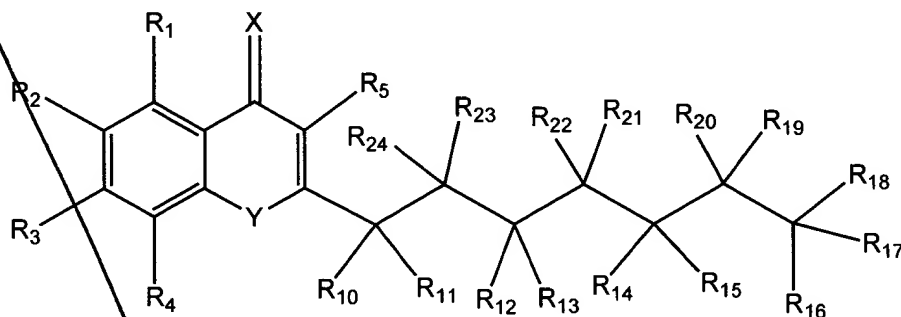


1. A compound of formula I

(I)



wherein:

R₁-R₄ are independently H, alkyl, alkenyl, alkynyl, OH, NH₂, SH, O-R₆, N-R₇R₈, or a halogen;

R₅ is SH, OH, O-R₆, or N-R₇R₈;

R₆ is H or C₁-C₄ alkyl;

R₇ and R₈ are independently H, C₁-C₄ alkyl, O, or S;

X is S, O, or N-R₉;

Y is N-R₉;

R₉ is H, O, S, or C₁-C₄ alkyl;

R₁₀-R₁₃ are independently H, C₁-C₄ alkyl, OH, NH₂, SH, O-R₂₅, N-R₂₆R₂₇, or a halogen, or R₁₀ and R₁₁ taken together form a carbonyl, a sulfonyl or an imino moiety, or R₁₂ and R₁₃ taken together form a carbonyl, a sulfonyl or an imino moiety;

R₁₄-R₂₄ are independently H, C₁-C₄ alkyl, OH, NH₂, SH, O-R₂₅, N-R₂₆R₂₇, or a halogen;

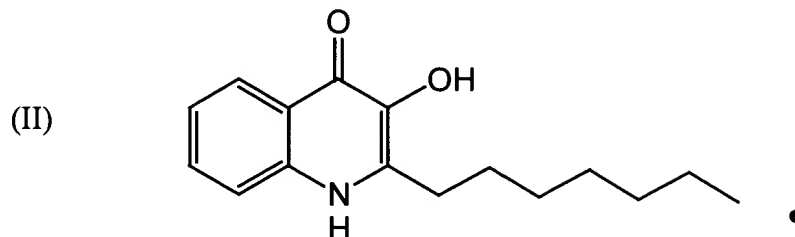
R₂₅ is H or C₁-C₄ alkyl; and

R₂₆ and R₂₇ are independently H, C₁-C₄ alkyl, O, or S; and

salts thereof.

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3. The compound of claim 1 that is different than 2-heptyl-3-hydroxy-4-quinolone.
4. The compound of claim 1, wherein R_{16} , R_{17} , and R_{18} are H.
5. The compound of claim 1, wherein R_2 is halogen.
6. The compound of claim 1, wherein R_3 is halogen.
7. The compound of claim 1, wherein R_4 is halogen.
8. The compound of claim 1, wherein X is S or N- R_9 .
9. ~~The compound of claim 1, wherein Y is O, S, or N- R_9 and wherein R_9 is C₁-C₄ alkyl.~~
10. ~~The compound of claim 1, wherein R_5 is H, SH, O- R_6 , or N- R_7R_8 , and wherein R_6 is C₁-C₄ alkyl.~~
11. The compound of claim 1, wherein R_5 is SH, O- R_6 , or N- R_7R_8 .
12. The compound of claim 1, wherein X is O.
-
17. The compound of claim 1, wherein the compound contains a chiral center.
18. The compound of claim 1, which is an optically active isomer.

19. The compound of claim 1, having the formula II:



20. A compound of claim 1 or 19, wherein said compound is an autoinducer molecule.
21. The compound of claim 20, wherein said compound regulates gene expression.
22. The compound of claim 21, wherein said compound regulates gene expression in bacteria.
23. The compound of claim 22, wherein said bacteria is *Pseudomonas aeruginosa*.
24. The compound of claim 23, wherein said gene expresses a virulence factor.
25. The compound of claim 24, wherein the virulence factor is elastase.
26. The compound of claim 20, wherein said compound regulates the activity of the LasR protein of *Pseudomonas aeruginosa*.
27. The compound of claim 20, wherein said compound regulates the activity of the RhlR protein of *Pseudomonas aeruginosa*.
28. The compound of claim 20, wherein said compound is isolated from culture media in which *Pseudomonas aeruginosa* is grown.
29. A compound of claim 1, wherein said compound modulates the autoinducer activity of 2-heptyl-3-hydroxy-4-quinolone.
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Q4 32. A compound of claim 1, wherein said compound modulates the activity of the LasR and/or the RhlR proteins of *Pseudomonas aeruginosa*.

Q5 34. The compound of claim 32 that is an agonist of the LasR and/or the RhlR proteins of *Pseudomonas aeruginosa*.